

REMARKS/ARGUMENTS

Reconsideration is again respectfully requested of the Final Office Action of March 25, 2008, relating to the above-identified application. Applicants are also responding to the comments in the Advisory Action of August 13, 2008.

A three month extension of time is filed herewith, together with the balance of the fee due taking into account that the fee for a one-month extension of time has already been paid.

The claims in the case are: Claims 1, 2, 4, 6, and 8 to 14.

Applicants again traverse the rejection of Claims 1 and 13 under 35 U.S.C. § 103(a) as unpatentable in view of *Hartmann, et al.*, (US 5,959,005) taken with *Menon, et al.*, (US 6,159,540) and request reconsideration.

Hartmann, as pointed out in the previous response is assigned to the same assignee as the present application and describes a method to produce a surface modified, hydrophobic silanized, silica powder with specifically defined physico-chemical properties as shown in Claim 1 (col. 2, lines 38-60). There is one, and only one, surface modifying substance disclosed by *Hartmann* whereby the pyrogenically produced silica is surface modified and that is the substance known as HMDS (Hexamethyldisilazane). The surface-modified silica of *Hartmann* also can be structure-modified (destructured). As is well known, the term “destructured silica” is understood in this art to refer to silica that has been subjected to mechanical action, such as a ball mill to alter the properties thereof.

Hartmann shows that the destructuring of the silica can be done by means of a vertical ball mill, see col. 2, line 19. The resulting product can be ground by an air jet mill in order to destroy the grit in the powder (see the example in col. 2, line 15-36).

The surface modified and destructured silica, according to the US 5,959,005 patent (*Hartmann*), is used as a filler in polymers like 2K-RTV silicone rubber (see the example in col. 2). According to col. 1, line 54, the silica can be used as a free-flow agent, particularly with fire extinguishing powders.

Hartmann (US 5,959,005) uses HMDS (Hexamethyldisilazane) only and does not mention or suggest any other surface modifying agents of any kind.

According to the present invention, applicants' silica are surface modified with silanes having the formula $(\text{RO})_3\text{SiC}_n\text{H}_{2n+1}$ or with silanes which will result in dimethylsilyl and/or monomethylsilyl groups attached to the surface of the silica. The silane I (hexadecyltrimethoxysilane) and silane II (octyltrimethoxysilane) are particularly preferred (see paras. [0030-0032] and the examples in Table 5).

The data on pg. 9, in Table 17 (paras. [0108-0109]), shows that the silicas according to the examples of the invention have a markedly smaller sieve residue and hence agglomerate content than the comparison products AEROSIL™ 200, AEROSIL™ R972 and AEROSIL™ R8200. The latter three are all prior known silicas produced by the assignee.

It is to be particularly noted that AEROSIL™ R8200 is the silica according to *Hartmann* (US 5,959,005) and the sieve residue is much larger; see Table 17.

The Advisory Action challenges the data in Table 17 on the basis that after mixing for 60 minutes, the AEROSIL R8200 has a lower sieve residue. The Advisory Action then says it is not clear how the silicas of example 9, 2 and 7 in Table 17 show unexpectedly better results.

However, attention is invited to the data relative to 5 minutes after mixing which shows that the sieve residue of the AEROSIL R2800 is much higher (29.0%) than the sieve residues of example 9, 2 and 7 of the invention (25.5%, 11.0% and 11.0% respectively).

The data in Table 17 can be better understood by referring to what is the practical effect and significance of this difference; that is, the mixing time to obtain good quality mixed fire extinguishing powders with the silicas of the present invention is shorter as compared to the silica representative of *Hartmann*.

This significant improvement in mixing times to obtain the intended product could not have been predicted from *Hartmann*.

The difference in behavior between the products of this invention and the products of *Hartmann* could not have been predicted. The improvements in fluidisability (Table 13), resistance to caking (Tables 14-16) and reduced sieve residue (Table 17) are important properties for a commercial product and are not foreshadowed by *Hartmann*. Nor would these improvements be apparent from the *Menon* patent.

The *Menon* patent is directed to a method of treating silica comprising:

- a) reacting silica with tri- or difunctional organosilanes in an aqueous acid medium to provide a crude product containing organosilane capped silica and organosilicon impurities;
- b) extracting the organosilicon impurities from the crude silica product with an organic liquid to provide a purified product consisting essentially of organosilane capped silica, and then
- c) drying the so purified product to obtain a dry organosilane-capped silica.

Thus, *Menon* describes the need for purification when using di- or tri- functional silanes because of contamination; see col.4 lines 16 et seq. Indeed, the two silanes mentioned in the Final Action, on page 3, line 2; namely, DMDCS and MTCS are singled out by *Menon* as illustrating the problem of contamination. Then why would a person skilled in the art be lead to select one or both of these silanes when the reference teaches these drawbacks?

Menon is focused on obtaining a purified dry organo-capped silica and does not contain any teaching that the silicas of *Hartmann* could be improved by replacing HMDS with the silanes defined by the present claims. Nothing of record teaches the interchangeability of the HMDS of *Hartmann* with the MTCS or DMDCS of *Menon*. Therefore, a person skilled in the art would have no reason to use one in place of another.

The Final Action takes the position that the two citations are combinable because they are concerned with the same field of endeavor, namely silanized silica. Yet not all silanizing agents have been shown to be equivalent. More importantly, the silanizing agents of *Menon*

have not been shown to be interchangeable with the HMDS of *Hartmann*. Neither is there any teaching in either reference that would lead a person skilled in the art to think of using the silanizing agents of *Menon* in the compositions of *Hartmann* as a replacement for HMDS. No advantage or benefit is taught in the prior art that would lead a person skilled in the art to replace the HMDS with anything else. There is simply no case of *prima facie* obviousness established by the combination of references and therefore the rejection should be withdrawn.

Notwithstanding the “advantages” listed in the Advisory Action for the silicas of *Menon*, the fact is that a person skilled in the art wishing to improve flowability or improve mixing times would not be persuaded by the “advantages” referred to by *Menon* to use his silanes because of the need for the extra extraction steps. Thus, with the teaching in *Menon* that monofunctional silanes (as that of *Hartmann*) are not as reactive and do not result in formation of polymeric organosilicon by products which must be extracted, there is no logical reason to change from the monofunctional silane of *Hartmann* to the compounds mentioned by *Menon*. The alleged lower cost referred to by *Menon* in col. 3 line 37 et seq. could be more than offset by the extraction cost. Although the Advisory refers to “stronger, more stable, capping of silicas” there is no evidence of record that the silanes of *Menon* would produce anything that is stronger and more stable.

As for the “economic benefit” in using MTCS from waste streams, no data is of record establishing that that the overall economic balance is superior to that of *Hartmann*,

particularly since an extraction process is needed by *Menon* which is not required by *Hartmann*.

Thus, applicants respectfully submit that *Menon*'s speculative statements as to "benefits" or "advantages" are not sufficiently compelling to overcome the definite drawback of having to use an extraction process to avoid the problems discussed by *Menon* in col. 4 line 16 et seq.

Applicants again traverse the rejection of Claims 2 and 14 under 35 U.S.C. § 103 (a) in view of *Hartmann, et al.*, taken with *Menon* and request reconsideration. Claims 2 and 14 are method claims directed to the method of improving the flowability of pulverulent materials by adding applicants' treated metalloids, metallic oxides or treated silicas to the pulverulent materials. *Hartmann* and *Menon* have already been discussed and the remarks made above apply here as well.

Menon does not disclose any pulverulent material and contains nothing that would suggest how pulverulent materials can be improved in any way. Neither does the record establish the interchangeability of any of the silanes of *Menon* with the HMDS of *Hartmann*. The Final Action says that a person skilled in the art would have selected the silanes of *Menon* because they are economical and environmentally beneficial. Yet, there is no evidence that *Menon*'s silanes are any more economical or beneficial than is HMDS. Speculation as to possible benefits cannot be the basis for rejection. Hence, the Final Action fails to make out a

case of *prima facie* obviousness for the subject matter of Claims 2 and 14. Therefore, applicants request that the rejection be withdrawn.

Applicants again traverse the rejection of Claims 4, 6, 8, 9, 11 and 12 under 35 U.S.C. § 103(a) in view of *Hartmann* taken with *Menon* and request reconsideration. Both of these references are discussed above and the remarks apply here as well. The rejected claims are drawn to compositions containing pulverulent materials and the silanized metalloid, metal oxide or silanized silica. The Final Action takes the position that a person skilled in the art would be lead to employ the silanized silicas of *Menon* in the *Hartmann* compositions because the *Menon* silanes are economical and environmentally beneficial. However, there is no evidence on record that *Menon's* silanes are any **more** economical or beneficial than the HMDS of *Hartmann*. Hence, the motivation to make the interchange of *Menon's* silanes for HMDS is lacking. A person skilled in the art would have no reason to make the change in the absence of evidence that there would be some benefit or advantage in doing so. That evidence is lacking in the present record. Therefore, applicants respectfully submit that the combination of references fails to establish *prima facie* obviousness. Withdrawal of the rejection is requested.

With regard to the rejection of Claim 10 under 35 U.S.C. § 103(a) in view of *Hartmann* taken with *Menon* further in view of *Koehlert, et al.*, US 5,928,723, applicants again traverse and request reconsideration. The two principal references have been fully discussed above and the remarks apply here as well.

Koehlert is relied on in the Final Action to show powdery materials. Powdery materials are well known and the industry is constantly trying to improve the flowability properties of such substances and the speed with which powdering substances can be mixed together. Many different substances have been used in the past to accomplish this purpose and not all have resulted in success. *Koehlert* attempts to address the problem by proposing an esterification process for the treatment of silicas. This reference adds little to the record herein because it does not even relate to silanes technology. Hence, a person skilled in the art and involved with silane modification of silicas would not even consider the *Koehlert* patent to be relevant. There is no suggestion in any of the references that powdery materials defined in Claim 10 could be improved in terms of mixing times. None of the references contain a broad teaching, contrary to the inference in the Advisory Action, as to the suitability of silane surface treated silicas for any and all purposes. Each reference is quite specific as to its teaching and no sweeping generalizations would be understood by those skilled in the art as leading to applicant's invention. The rejection fails to establish *prima facie* obviousness and the rejection should be withdrawn.

Favorable action at the Examiner's earliest convenience is respectfully requested.

Respectfully submitted,

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